

EVALUATION OF BACITRACIN DISK FOR THE IDENTIFICATION OF GROUP 'A' BETA-HEMOLYTIC STREPTOCOCCI

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ABSTRACT

A total of 711 beta-hemolytic streptococci were isolated from throat cultures of patients during 1970-73. These strains were grouped in parallel by the precipitin and bacitracin paper disk methods. The former method was established as the standard by which the bacitracin technique was compared. The difference in results was about 5.67%. The greatest error (5.4%) was seen with non-group A strains being sensitive to bacitracin. In spite of this, it was shown to be advantageous to use the bacitracin disk for primary isolation from throat cultures rather than to consider all beta-hemolytic streptococci isolated as group A, which would give a magnitude of error around 16%.

INTRODUCTION

Identification of group A β -hemolytic streptococci from other groups in upper respiratory infection is essential, owing to late sequelae which are caused by the former. The only satisfactory means for differentiation of group A hemolytic streptococci has been a serological method.⁽¹⁾ The supply of anti-sera is limited and the method requires considerable skill and technical experience if any high degree of accuracy is to be obtained. Furthermore, the method is time-consuming and not very practical for hospital routine and for patients referred to laboratories from private physicians. Therefore, Maxted⁽²⁾ proposed the use of bacitracin paper disk for differentiating group A hemolytic streptococci. The principle of this test is a higher sensitivity of group A streptococci than of other hemolytic streptococci to bacitracin. The reliability of the test has at times been challenged,^(3,4,6) although the majority of reports support the test as a screening method for group A β -hemolytic streptococci.⁽⁵⁾ The purpose of this paper is to report our experience in testing 711 strains.

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MATERIALS AND METHODS

The streptococcus was spread over half of a 5% sheep blood agar plate and a Difco bacitracin disk specifically prepared for identification of group A streptococci was placed in the center where the growth is uniform. The plates were incubated at 37°C and the results were read after 18-24 hours. Any zone of inhibition was considered as a sensitive strain. Commercial bacitracin disks were used intentionally, since hospitals and laboratories all over the country use these and the authors wished the comparison of the serological grouping and disk methods in Teheran to be as realistic as possible. A total of 711 strains of beta-hemolytic streptococci isolated from throat cultures of patients during 1970-73 were tested. All strains were serologically identified by the method of Fuller (7) This method was considered as a standard against which the bacitracin method was compared.

RESULTS

TABLE I
Sensitivity of 711 strains of
beta-hemolytic streptococci to bacitracin

Cultures Tested	Group A	Group B	Group C	Group G	Not Group A, C or G	Total other than Group A
Bacitracin sensitive	380	0	1	8	9	18
Bacitracin resistant	1	9	128	98	77	312
Total	381	9	129	106	86	330

Table I is the summary of results obtained from examining 711 strains of beta-hemolytic streptococci and grouping them by precipitin and bacitracin techniques.

DISCUSSION

As noted in Table I, the greatest error was seen with non-group A strains being sensitive to bacitracin. From 330 non-group A strains, 18 (5.4%) were sensitive. These findings are consistent with previous reports by Chitwood and Jening.(5) From 381 group A strains, only 1 about (.27%) was resistant to bacitracin. The problem, therefore, is greater of false positive reactions than false negative reactions. Thus it follows that in areas where non-group A

strains are more prevalent, as in Iran or Egypt (9,8,10) the bacitracin test is less reliable. Similarly, the reliability is higher when analyzing strains from acute human streptococcal infection than when analyzing strains from healthy carriers where non-group A strains are encountered more frequently.(3)

During the autumn and winter seasons, when respiratory infections are frequent, 16% of the $\alpha\beta$ -hemolytic streptococci isolated from cases of pharyngitis were non-group A.(11) Therefore, had we not used bacitracin disk and reported all streptococci isolated as group A, our magnitude of error would have been 16%. From our results, using the bacitracin disk and considering the false positive and negative reactions, the error may be around 6%. It seems, then, that even during seasons when streptococcal sore throats are prevalent, it is still advantageous to use the bacitracin disk for the primary isolation. This is, of course, under circumstances when meticulous care is given regarding the streaking of the plates and also the potency of the bacitracin disk. The situation may differ in a busy routine laboratory when the accuracy may fall. Taking such matters into consideration, this test, using commercial products, compares favorably with the precipitin^o grouping method.

ACKNOWLEDGEMENT

This study has been partly supported by the School of Public Health, University of Teheran, and in part by the Institute of Public Health Research, from the funds of the Ministry of Health and Plan Organization for Health Development.

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